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# Book reviews and notices

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## Introduction

Monographic systematic treatments of diverse fungal groups are the focus of this installment of Book reviews and notices. The first four reviews cover four volumes in the series Studies in Mycology that focus on different groups of *Ascomycota*. The other five publications have *Agaricales* and *Russulales* as the subject. A worldwide overview of the species and genera in the *Xerula/Oudemansiella* complex, *Lactarius* in Africa, and European representatives of the genera *Hygrocybe*, *Conocybe* and *Pholiotina*, and *Agaricus* are reviewed. These books, although with a regional approach, have a much wider usability than only for the region for which they were researched and written. Most of these books are lavishly illustrated with colour pictures, thanks to today's digital cameras and the modern printing techniques. The Internet with its resources and digitalized texts means that mycology is no longer only a privilege for those with access to well-stocked libraries. The two books in the series Fungi Europaei that are reviewed here are examples of this democratization process, as both authors are not mycologists by profession: the author of the *Agaricus* book is a practicing veterinarian. It seems fitting that he explicitly acknowledges the on-line sources for old(er) mycological literature.

This contribution concludes with a list of newly published books to be included in upcoming Book reviews and notices.

[1] Books for consideration for coverage in this column should be mailed to the Book Review Editor at the address above. All unsigned entries are by the Book Review Editor.

## *Ascomycetes*

**A phylogenetic re-evaluation of *Dothideomycetes*.** By C.L. Schoch, J.W. Spatafora, H.T. Lumbsch, S.M. Huhndorf, K.D. Hyde, J.Z. Groenewald & P.W. Crous. 2009. STUDIES IN MYCOLOGY no. 64. CBS Fungal Diversity Centre, PO Box 85167, 3508 AD Utrecht, The Netherlands. <info@cbs.knaw.nl>. Pp. vi + 220, illustr. ISBN 978-90-70351-78-6. Price: 65 €.

The taxonomy of the dothideomycetous fungi, i.e. most of those with bitunicate asci, has been in a state of continuous flux for over a century, with vastly different systems being proposed by some and then overturned by others. Part of this difficulty has been a consequence of how particular characters should be interpreted and weighted, but even more of a problem has been the vastness of the group, which makes it difficult for a single mycologist to appreciate the breadth and complexity of the included fungi – both morphologically and biologically. The most significant morphologically based works on the group in the last quarter of the 20th century have been the generic keys and compilation of synonyms by von Arx & Müller (1975), the critical studies on the types of family names by Eriksson (1981), and the illustrated overview of families and genera by Barr (1987). The present issue is fittingly dedicated to the three of those now deceased. However, all these authors adopted different systems of orders and families, and development of a robust classification has only become feasible with the advent of molecular phylogenetic methods. In such a complex group, inadequate sampling, even at the ordinal level, has meant that molecular phylogenies have also been in flux. Indeed, it is only in the last few five years that a more stable backbone has started to emerge as the representation of families and genera has improved. The present volume evidences the enormous and exciting progress that has been made, but simultaneously reveals areas of continuing uncertainty and instability where yet more work is required.

The scene is set by a five-gene phylogeny derived from 356 isolates representing 41 families (of which six are newly described elsewhere in the volume) and all currently accepted orders. Prepared by Schoch and 53 co-authors, this also includes an analysis of the biology of the taxa, leading to the somewhat contentious view that there have been numerous transitions from saprobic to plant-associated and lichenized life-styles. However, a genome-level comparison revealed a high level of unique protein coding genes in the class compared with other fungi, supporting the recognition of *Dothideomycetes* as a distinct class. The major part of the volume, however, is devoted to more detailed studies of particular orders, families, or representatives with different biologies or ecologies.

The monophyly and family structure in *Capnodiales* is addressed by Crous et al., where the main surprise is the placement of *Piedraiaceae* inside *Teratosphaeriacee*; the new family *Dissoconiaceae* is also proposed. The families and genera of the former *Hysteriales* are revisited in a multi-gene phylogeny by Boehm et al.; *Hysteriales* is supported as sister to *Pleosporales*, while *Mytilinidiales* (including *Gloniaceae*) is sister to both. Here a particularly surprising find was that the asexual *Cenococcum geophilum* falls in *Gloniaceae* – a result that may merit more critical scrutiny. In the case of *Pleosporales,* Zhang et al. compared five loci in representatives of 59 genera and 15 families; two new families (*Amniculicolaceae, Lentitheciaceae*) are introduced, *Pleomassariaceae* is included in *Melanommataceae,* and the familial positions of several genera are clarified. Mugambi & Huhndorf revisit the *Melanommataceae* and *Lophiostomataceae* issue; while both families and *Hypostromataceae* were recovered, *Melanommataceae* and, in particular, *Melanomma* remain polyphyletic — however, *Bertiella* and *Herpotrichia* did belong to that family, and an atypical new genus *Misturatosphaeria* is described.

The problem of unnamed lineages recovered from rock is explored further by Ruibal et al., who again emphasize the phylogenetically diverse positions of these superficially rather similar fungi; they include representatives of four dothideomycete orders but one lineage appears closer to *Arthoniomycetes* — many more of these rock-inhabiting fungi clearly remain to be found, and at least the main lineages will eventually have to be named as new genera, even in the absence of either a sexual or an asexual stage, if no already named fungi sequenced continue to prove to be distinct. Nelsen et al. treat the lichenized representatives of *Dothideomycota* based on nuLSU and mtSSU sequence data; *Arthoniomycetes* and *Dothideomycetes* are supported as separate classes; the study shows that in several cases generic concepts require revision, while *Mycomicrothelia* (a genus which includes both lichenized and non-lichenized species) is found to be sister to *Trypetheliaceae* rather than a member of *Arthopyreniaceae*. Shearer et al. studied 169 freshwater isolates, of which 84 belonged in *Dothideomycetes;* within the four clades including only freshwater species — *Jahnulales* the largest (the others being *Lingoldiomycetaceae*, *Amniculicolaceae,* and *Tingoldiago* + allies) — the aquatic habit is regarded as secondary, all having terrestrial ancestors. Suetrong et al. reached similar conclusions for marine *Dothideomycetes*, which were found to be dispersed through 12 families in six orders in a four-gene phylogeny; most occur on intertidal plants and are tropical, with novel taxa continuing to be recognized, which include two new families (*Aigialaceae, Morosphaeriaceae*) and three new genera introduced here. Finally, Tanaka et al. propose the new family *Teratosphaeriaceae* for five new genera of *Massarina*-like bambusicolous fungi

with *Tetraploa* and *Tetraploa*-like anamorphs or which only produce conidia; here the beautiful *Quadricrura* has species with 1–2 long apical and 4–5 short more basal setae.

The whole issue is illustrated by stunning top-quality and artistically composed colour photomicrographs, and also colour-coded phylograms, which greatly facilitates their interpretation. There is no doubt that this will be regarded as a classic work on the class (!), but I was disappointed that only one chapter (Boehm et al.'s on the hysterioid groups) included any keys. Keys to families, and at least the genera and species treated in detail, would have made the work much more accessible to those wishing to use this volume in making identifications using microscopic characters. Mycologists with access to superbly equipped and resourced molecular laboratories, supported by skilled technicians, should not forget that they represent a privileged section of the potential user-community of systematic works.

Arx JA von, Müller E. 1975. A re-evaluation of the bitunicate ascomycetes with keys to families and genera. Studies in Mycology 9: 1–159.

Barr ME. 1987. Prodromus to Class *Loculoascomycetes*. Amherst, MA: ME Barr.

Eriksson OE. 1981. The families of bitunicate ascomycetes. Opera Botanica 60: 1–220.

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**Highlights of the *Didymellaceae*: a polyphasic approach to characterise *Phoma* and related pleosporalean genera.** By M. Aveskamp, H. de Gruyter, J. Woudenberg, G. Verkley & P.W. Crous. 2010. STUDIES IN MYCOLOGY no. 65. CBS Fungal Diversity Centre, PO Box 85167, 3508 AD Utrecht, The Netherlands. <info@cbs.knaw.nl>. Pp. iv + 64, illustr. ISBN 978-90-70351-79-3. Price: 40 €.

With over 3200 species names in Index Fungorum/MycoBank, *Phoma* is surely one of the largest morasses requiring resolution amongst the microfungi. This slim volume does not have all the answers, but makes important inroads into identifying the directions of future work by re-assessing the nine-section morphology based system of Boerema et al. (2004; see MYCOTAXON 90: 487–492, 2004); the sections in that system were separated by differences in pycnidial wall anatomy, the occurrence of setae, conidium size, and the presence of chlamydospores. In this issue of STUDIES, a commendable 324 strains are compared by molecular phylogenetic methods, representing 206 taxa of which 159 are *Phoma*-like. Eighteen clades are recognized which, perhaps not surprisingly, do not correlate with the earlier sectional system. Just four of those clades — ones that could be separated morphologically

— are named here: *Didymella* (incl. *Phoma herbarum*, the type species of *Phoma*), *Boeremia* gen. nov. (for *P. exigua* and allied species), *Peyronella* (with teleomorphs formerly in *Didymella* and *Mycosphaerella* — controversially combined under the anamorphic name), and *Stagonosporopsis* (for the former *Phoma* sect. *Heterospora*). In addition, the anamorphs of *Leptosphaerulina* and *Macroventuria* came together in another of the 18 clades. No links with any true *Mycosphaerellaceae,* or indeed any group in *Capnodiales*, were upheld. Sixty-one new combinations are made, and eight new species and two new varieties are described in addition to the new genus.

In view of the limited representation of the treated species, almost all of which are from plants and known in culture, it will be interesting to see whether there is any change in the support for the clades found here when specimens from other host plants, and such disparate hosts as lichens, can be incorporated into the analysis. In the meantime, those working with the untreated species will have to be content to continue to use the current morphology based circumscription of *Phoma*, but in doing so should also appreciate that they are being pragmatic and using the name ad interim in a polyphyletic sense.

Boerema GH, de Gruyter J, Noordeloos ME, Hames MEC. 2004. *Phoma* Identification Manual: differentiation of specific and infra-specific taxa in culture. CABI Publishing, Wallingford.

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**Systematics of *Calonectria*: a genus of root, shoot and foliar pathogens.** By L. Lorenzo, P.W. Crous, B.D. Wingfield & M.J. Wingfield, 2010. Studies in Mycology 66. CBS Fungal Biodiversity Centre, Uppsalalaan 8, 3584 CT, Utrecht, the Netherlands. <info@cbs.knaw.nl>. Pp. iv + 71, illustr. ISBN 978-90-70351-81-6. Price: 40 €.

The approach taken in this taxonomic revision may be controversial for nomenclatural pedants, but it is pragmatic in a time when changes in the International Code of Botanical Nomenclature relating to the separate naming of states of pleomorphic fungi may be imminent. They treat the generic name *Cylindrocladium,* which is typified by a conidial state fungus, as a regular synonym of *Calonectria,* which is based on a sexual state; i.e. they apply the one-name-for-one-fungus approach, which can only be welcomed by those working with these fungi. The proclamation that "new species should be described in *Calonectria* irrespective of whether the teleomorph is known or not" (p. 3) is pragmatic in this case, where there is a complete congruence between the circumscriptions of the two genera.

The issue comprises three contributions. First is a discussion of species concepts and the nomenclatural approaches adopted, also emphasizing the importance of the genus as plant pathogens. Second is what might be seen as an exemplar study of the plant pathogenic *Calonectria pauciramosa* s. lat. in which a multigene phylogeny and mating tests demonstrate the occurrence of three previously unrecognized cryptic species, which are here described as new. But it is the third that will be of especial interest to those concerned with identification of fungi in the genus – a multigene phylogeny and synopsis that accepts a total of 68 species, of which seven are new to science, and 18 new combinations (all with basionyms in *Cylindrocladium*). Diagnostic characters of the conidial states are illustrated by photomicrographs, and most pleasing are the synoptic and dichotomous keys to the 68 species now accepted under *Calonectria* (i.e. including *Cylindrocladium*). While this is no monograph with detailed descriptions and information on hosts and distributions (as the authors recognize on p. 10), the issue will facilitate the accurate identification of these fungi by plant pathologists and citizen scientists. All concerned with these fungi will need to have this to hand, at least until a full monographic treatment becomes available.

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**Species and ecological diversity within the *Cladosporium cladosporioides* complex (*Davidiellaceae, Capnodiales*).** By K. Bensch, J.Z. Groenewald, J. Dijksterhuis, M. Starink-Willemse, B. Andersen, B.A. Summerell, H-D Shin, F.M. Dugan, H-J Schroers, U. Braun & P.W. Crous, 2010. STUDIES IN MYCOLOGY 67. CBS Fungal Biodiversity Centre, Uppsalalaan 8, 3584 CT, Utrecht, the Netherlands. <info@cbs.knaw.nl>. Pp. iv + 96, illustr. ISBN 978-90-70351-83-0. Price: 50 €.

Our understanding of the taxonomy of the remarkably successful fungi referred to *Cladosporium* has advanced dramatically over the last few years as more and yet more isolates have been studied by molecular phylogenetic methods – as witnessed by a previous number of STUDIES devoted to the genus, its dismemberment, and also revisions of species concepts in *C. herbarum* and *C. sphaerospermum* (Crous et al. 2007; see MYCOTAXON 107: 507–509, 2009). This new number of the STUDIES might be viewed as a continuation or supplement to that of 2007 in addressing *C. cladosporioides* — a name widely used for saprobic fungi of the genus occurring on decaying or diseased plant parts and well-known as a spoilage and indoor mould growing on materials such as damp plasterwork. Now, over 200 isolates of the complex have been

analyzed by a multigene approach — resulting in an explosive expansion of the group. While the precise application of the name *C. cladosporioides* is fixed here by neo- and epitypification, a staggering 22 species are described as new to science. Although recognized as a result of molecular studies, diagnostic micromorphological features were found: differences in the shape, width, length, septation, and surface ornamentation of the conidia and conidiophores; the length and branching patterns of conidial chains; and hyphal shape, width, and arrangement. The surface features of the conidia were examined using Cryo-SEM and the conidia were found to have a characteristic reticular or embossed striped ornamentation. All these features are seen in the superb photomicrographs provided, which leave no doubt that there are non-molecular characters of value, even though very careful comparisons will often be required.

I was very pleased to see that a dichotomous key had been provided, and that the couplet characters were almost all morphological or micromorphological. However, variability has necessitated that several species were keyed out more than once and, somewhat frustratingly, no micromorphological features were found to distinguish some of the novel phylogenetic species closest to *C. cladosporioides* s. str., so that after the couplet leading to that name placed in parenthesis is "(including morphologically indistinguishable but phylogenetically distinct lineages)." The implication of this is that, without molecular sequence data, it is no longer possible to recognize *C. cladosporioides* s. str., which means that morphological identifications will have to have appended "complex" or "s. lat." A further complication is that instances were found where several isolates from a single location and precise substratum (e.g., an individual plant) yielded more than one widely separated species of the complex. The phenomenon of co-occurrence of different species of *Mycosphaerella* and *Teratosphaeria* in the same leaf lesions has previously been documented, so this result is perhaps not surprising, but it does mean that enormous care is needed in isolating these fungi from natural habitats to be confident that representative lineages have been obtained. This revision has consequently elegantly clarified the species concepts in this group of economically important fungi, but simultaneously made it more difficult for some of the members now known to be in the complex to be identified in the absence of molecular data.

Crous PW, Braun U, Schubert K & Groenewald JZ (2007) The genus *Cladosporium* and similar dematiaceous hyphomycetes. Studies in Mycology 58: 1–253.

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## *Agaricales and Russulales*

**The *Xerula/Oudemansiella* complex (*Agaricales*).** By R.H. Petersen & K.W. Hughes. 2010. BEIHEFTE NOVA HEDWIGIA 137. J. Cramer in der Gebr. Borntraeger Verlagsbuchhandlung, Johannesstraße 3A, 70176 Stuttgart, Germany. <mail@schweizerbart.de>. Pp. 625, plates 31, figs 576. No ISBN number. Price 179.00 €

The complex of the agaricoid genera *Xerula* and *Oudemansiella* (*Physalacriaceae*, *Agaricales*) is unraveled in great detail in this taxonomic treatment by Ron Petersen and Karen Hughes. The 625-page thick book reveals a much greater complexity than ever imagined. The complex is morphologically studied, and ITS and LSU phylogenies are constructed.

Let us first look at the contents of the book. After a general introduction with a history of the genera/genus and its classifications, material and methods for the research are given, followed by a chapter on the DNA-based phylogenies. 330 pages are devoted to genus and species descriptions, keys to the species, line drawings, and photographs. The next 200 or so pages contain the type studies, and finally a list of new taxa and new combinations, indices, and literature references fill the rest of the pages.

A big problem faced by the authors was how to name the supraspecific taxa, and whether to recognize one genus or name the separate clades. The choice was made to split the group and to recognize seven genera, four of them newly described here, some of them distinctly not monophyletic, but morphologically distinct and homogeneous. The two genera with non-rooting fruitbodies that grow directly on wood are *Oudemansiella*, restricted to tropical species without a persistent annulus, and *Mucidula* as the temperate counterpart with a persistent annulus. Although the two look very much alike, they are not sister groups. The other five genera all have a 'rooting' stipe connected to subterraneous wood or tree roots. The old *Xerula* is redistributed into *Xerula* (in the strict sense) for species with thick-walled setae on the pileus; *Paraxerula* harbours species with thin-walled setae on the pileus; *Hymenopellis,* with the highest number of species, is characterized by a moist to glutinous pileus; *Protoxerula* species, also with a sticky pileus, occur in Australia and have green colours; species with spiny spores are accommodated in the genus *Dactylosporina*; and *Ponticulomyces* (which did not make it into the general key) is an Asian clade of two species with characters in between *Hymenopellis* and *Oudemansiella*. *Hymenopellis* is not a monophyletic unit, and several other genera are nested within it; which genera depend on which gene region the phylogeny is based. The position of *Mucidula* in the middle of *Hymenopellis* was not expected. It is surprising that the authors have not tried to show more support for these decisions by either analyzing the data with topological constraints (such as a

monophyletic *Hymenopellis*) or adding data from protein coding genes. Another solution might be to recognize three genera — *Xerula* s. str. and *Paraxerula* as defined above plus *Oudemansiella* containing all other taxa, including the secotioid genus *Cribbea*. All three form well supported monophyletic clades in the ITS and the LSU phylogenies. Personally, I find the recognition of non-monophyletic genera very problematic, and this is my main critique on this book.

Besides the four new genera, four new species are described, one from Guyana, one from the USA, a third from India, and the fourth from eastern Russia.

The value of this monograph lies in the very thorough descriptions, not only of all accepted taxa, but also and especially of all the type specimens that could be studied. It is also extremely pleasant to have all this information in one place, and not scattered over various publications in a diverse set of journals. However, the information on the type collections should be searchable on the web, ideally linked to nomenclatural data, such as in Index Fungorum or Mycobank. On the negative side is of course the cost of this book, a high price that will certainly deter people in less developed countries from purchasing. This is very infelicitous, as the highest diversity of these taxa is in Asia.

The quality of the photos is variable, and some have been reproduced in a strange way. Unfortunately, but understandably, not all taxa are depicted with a colour plate.

With a book of this size it is inevitable that details have been overlooked; one Latin description never got beyond the first phase of some jotted down characteristics, the epithet 'kuehneri' is consistently misspelled as 'kuehnerii', and diacritical signs in non-English article titles and publications are not or wrongly applied.

This book should nonetheless find a wide audience due to its thorough descriptions and worldwide coverage.

***Agaricus* L. *Allopsalliota* Nauta & Bas.** Fungi Europaei 1. 2nd Ed. By L. A. Parra Sánchez. 2008. Edizioni Candusso, Via Ottone Primo 90, 17021 Alassio SV, Italy. <maxcandusso@libero.it>. Pp. 824, Plates 396 + 42, figs 114. ISBN 88-901057-7-1. Price 75.00 €.

This new book in the series Fungi Europaei replaces the 1984 and first volume on the genus *Agaricus* in the series on European fungi. This volume consists of a thorough and well-illustrated introduction to the genus, keys to the subsections, and extensive descriptions of and notes on the 35 species and varieties in sections *Agaricus*, *Bivelares*, *Chitonioides*, *Sanguinolenti,* and *Spissicaules*. The other two sections, viz. *Minores* (with subsections *Minores* and *Arvenses*) and

*Xanthodermatei*, the subgenus *Lanagaricus,* and the genus *Allopsalliota* will be covered in Part 2 that was scheduled to appear in 2009/2010, but one which we are still eagerly awaiting.

The book was written in Spanish with an English translation, and an Italian translation of the keys is also provided, which partly explains the volume of it. It is lavishly illustrated, with line drawings of the microscopical characters, numerous photos — always several per species showing the variability and changes the fruitbodies go through during maturation, and photos of micromorphological characters. Important characters are often separately illustrated, and photos of spot tests made with various chemicals are given as well.

The introduction alone is reason to buy this book: all you ever wanted to know about *Agaricus*, and much more, is covered. The overview of the characters that are used in *Agaricus* classifications and species recognition is excellent, with many colour photos to illustrate them.

Original diagnoses and plates are reproduced, either in black and white in the text or at the end as colour plates. This is a very valuable asset of this whole series.

Tables compare spore sizes by different authors for the taxa or give comparisons of closely related species.

This book is extremely well researched and executed. Although the European taxa are the focus of the book, its usage exceeds this area, for several reasons. First of all, it provides a clear concept of the European species, and secondly, mushroom species do not read maps and are not constrained by political boundaries. It is also very fortunate that the author has teamed up with those *Agaricus* researchers who apply molecular-phylogenetic methods to the genus for species recognition and circumscription.

A small comment I have is that it would have helped the user to have headers with the species names on top of the pages.

The happy spores on page 367 reflect my feelings when browsing through this book. The only thing missing is the mushroom smells…

Cappelli, A., 1984. *Agaricus* L. : Fr. (*Psalliota* Fr.) Fungi Europaei 1. Libreria editrice Biella Giovanna, Saronno.

***Conocybe* Fayod. *Pholiotina* Fayod.** FUNGI EUROPAEI 11. By A. Hausknecht. 2009. Edizioni Candusso, Via Ottone Primo 90, 17021 Alassio SV, Italy. <maxcandusso@libero.it>. Pp. 968, plates 46 + 403, figs 150, maps 154. ISBN 88-901057-8-X. Price 79.00 €.

Another thorough and excellent monograph in the FUNGI EUROPAEI series, volume 11 harbours all European taxa of *Conocybe* and *Pholiotina*. After the classic but of course heavily outdated 1935 book on the genus *Galera* by Kühner

and the much more recent work on the Dutch species by Arnolds (2005), this will be the book for the future on all aspects of these two genera. In almost 1000 pages, the 101 *Conocybe*, and 26 *Pholiotina* species are described, compared with each other, and illustrated with colour photos, watercolours, and black-and-white microdrawings. Little maps show in which European countries the species were found. As in the other volumes in the series, the original descriptions are reproduced and type studies are provided. The book starts out with an extensive introduction to the two genera, covering the history, classifications, and an overview of the main characters. This introductory text is in three languages: English, Italian, and German. The keys and descriptions of the supra-specific taxa are also trilingual, species descriptions are in English, and comments are in English and German. The list of examined collections also notes whether that particular collection is depicted in the literature, a feature I have not seen elsewhere.

Thickness and colour of the spore wall turn out to be very important in the identification, and it is a pity that those characters are not depicted. The line drawings fall short here (the ones in Arnold's work are of better quality), and colour photos would have been more helpful.

The author also contributed to the sections on the two genera in Funga Nordica (2008), but the present work covers a much wider area and more species. With the relatively low cost of this book, it should find its way to many mycologists' bookshelves.

Arnolds E. 2005. *Conocybe*. *Pholiotina*. In Noordeloos ME, Kuyper ThW, Vellinga EC (eds). Flora agaricina neerlandica 6: 120–203. Taylor & Francis, Boca Raton, etc.

Hausknecht A, Vesterholt J. 2008. *Conocybe; Pholiotina*. In Knudsen H, Vesterholt J (eds). Funga Nordica: 626–645; 651–657. Nordsvamp, Copenhagen.

Kühner R. 1935. Le genre *Galera* (Fries) Quélet. Lechevalier, Paris.

**The genus *Hygrocybe*.** 2nd revised edition. Fungi of Northern Europe Vol. 1. By D. Boertmann, 2010. Danish Mycological Society, Søvænget 9, 3100 Hornbæk, Denmark. <svampetryk@webspeed.dk>. Pp 200, colour plates, line drawings, distribution maps. ISBN 978-87-983581-7-6. Price DKK 280

The second edition of this handsome book, in which the *Hygrocybe* species form northern Europe are depicted and described, shows some significant changes in comparison with the first (Boertmann 1995), now out of print: it is in hardcover, and three additional taxa are treated, many new colour plates of these bright and beautiful fungi are added showing more than ever the extreme colour variability, and the introduction and references are updated. Not yet updated are the genus names that might have to be adopted because of the progress in phylogenetic studies based on DNA comparisons. *Hygrocybe* in the sense presented here is not monophyletic. Some species are better placed in

*Omphalina/Arrhenia*, outside the *Hygrophoraceae*, *Cuphophyllus* (also known as *Camarophyllus*) and *Gliophorus* are well characterized genera within the *Hygrophoraceae*, but as there is not yet a thorough molecular-phylogenetic analysis of the family as a whole, these decisions have been postponed. Three new combinations that were invalidly introduced in FUNGA NORDICA (Boertmann 2008) are here validated.

The photos are just plain beautiful and in themselves a reason to buy this book. This book is particularly valuable for all who are trying to survey, manage and conserve the vulnerable unfertilized grasslands in (northern) Europe, and the author mentions, with pride, a British court case in which the presence of wax caps stood in the way of building developments. Of course, this book can be used in a much larger area than just northern Europe; it gives well-illustrated descriptions of the European species whose names are widely applied elsewhere.

Boertmann D. The genus *Hygrocybe*. Fungi of northern Europe vol. 1. The Danish Mycological Society.

Boertmann D. 2008. *Hygrocybe* (Fr.) P. Kumm. In Knudsen H, Vesterholt J (eds). Funga Nordica: 194–212. Nordsvamp, Copenhagen.

**Fungus flora of tropical Africa. Volume 2. Monograph of *Lactarius* in tropical Africa.** By A. Verbeken & R. Walleyn. 2010. National Botanic Garden of Belgium, Nieuwelaan 38, 1860 Meise, Belgium, <sales@br.fgov.be>. Pp. 151, plates 54. ISBN 978-90-726-1981-5. Price 50.00 €.

Isolated early from the other continents and bounded to the north by the Sahara Desert, the African tropical forests possess an ectomycorrhizal mycota that is largely — perhaps completely — endemic (Verbeken & Buyck 2002). For over three-quarters of a century, the National Botanical Garden of Belgium has fostered the scientific knowledge of ectomycorrhizal and other macromycetes in central Africa through collecting expeditions and the publication series FLORE ICONOGRAPHIQUE DES CHAMPIGNONS DU CONGO (18 volumes; 1935-1972) and FLORE ILLUSTRÉE DES CHAMPIGNONS D'AFRIQUE CENTRALE (17 volumes; 1972-1997). A new series, the FUNGUS FLORA OF TROPICAL AFRICA (2007-present), represents a continuation of the two previous series. In the second volume of the FUNGUS FLORA OF TROPICAL AFRICA, Professor Annemieke Verbeken of Ghent University (Belgium) and the late Ruben Walleyn (1966-2008) present a monographic study of the genus *Lactarius* (*Basidiomycota*, *Russulales*) in tropical Africa.

Outside of Heim's (1938, 1955a, b) studies in Madagascar, Congo, and Western Africa, studies of *Lactarius* in tropical Africa were restricted to scattered species

descriptions until the early 1990s. In 1993, the authors began focused studies on *Lactarius* in this region, and the present volume compiles a substantial amount of knowledge about the topic. Verbeken and Walleyn present descriptions of 96 species and 2 accepted varieties within 17 subgeneric sections, with taxonomic keys to tropical African species provided for each section. A detailed, 20-page section describing taxonomically valuable characters is richly illustrated with line drawings of micromorphological features. Species descriptions are detailed and accompanied by exceptional line drawings. Eighty of the species are represented within the 54 full-page color plates by photographs, watercolors by M. Goosens-Fontana (whose striking watercolors appear in the previous two publication series), or both. The color photographs (mostly by the authors, B. Buyck, or A. De Kesel) are impressively large (most are half-page scale – significantly larger than those in most field guides, not to mention other monographs) and nearly all of them are of excellent quality; both characteristics combine to make the plates a valuable source of visual information. References, a taxonomic index, and French translations of the taxonomic keys are provided. At a list price of 50 € ($68 US), this volume is quite reasonably priced given the number of photographs, and demonstrates that it is indeed possible to publish richly illustrated yet affordable taxonomic texts.

Though recent molecular systematic studies have established the non-monophyly of *Lactarius*, a phylogenetic classification at the sectional and species levels has not yet been achieved; therefore, the authors adhere to a more traditional, morphology-based concept in the classification used in this book, with the exception of including the sequestrate genera *Arcangeliella*, *Zelleromyces*, and *Gastrolactarius* that have previously been shown to be synonymous with *Lactarius*.

The authors note that approximately 25% of the species described in this volume are known only from the type locality, highlighting the fragmentary state of knowledge about *Lactarius* (the same could be said of most other genera) in tropical Africa; at the same time, however, the present volume makes an extremely valuable contribution toward reducing the size of this problem. While the high endemicity of the African mycota reduces somewhat the utility of this monograph for identifying species found elsewhere, the data and specimens represented therein provide a critical component for understanding the biogeography of *Russulaceae* and tropical ectomycorrhizal fungi in general. The detailed introductory section on taxonomically valuable characters alone is an important enough resource that researchers and students of *Lactarius* should own a copy of this book. This impressive volume excels both in terms of scientific value and aesthetic quality, and I highly recommend it not only to

persons with a specific interest in *Lactarius* or the African mycota, but to any amateur or professional mycologist who wishes to be inspired by an outstanding example of taxonomic mycology.

Heim R. 1938. Les lactario-russulés du domaine oriental de Madagascar. Prodr. Fl. Mycol. Madagascar Dépendances 1: 1–196.

Heim R. 1955a. Les lactaires d'Afrique intertropicale (Congo belge et Afrique noire française). Bull. Jard. Bot. Etat Bx. 25: 1–91.

Heim R. 1955b. *Lactarius*. Flore Iconographique des Champignons du Congo 4: 81-97.

Verbeken A, Buyck B. 2002. Diversity and ecology of tropical ectomycorrhizal fungi in Africa. In: Watling R, Frankland JC, Ainsworth AM, Isaac S, Robinson CH. (eds). Tropical Mycology, Volume 1: Macromycetes: 11–24. Wallingford, CABI Publishing.

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## BOOK ANNOUNCEMENTS

***Corticiaceae* s.l. Fungi Europaei 12.** By A. Bernicchia & S.P. Gorjón. 2010. Edizioni Candusso, Via Ottone Primo 90, 17021 Alassio SV, Italy. <maxcandusso@libero.it>. Pp. 1008, plates 427, figs 455. ISBN 978-88-901057-9-1. Price: 77.00 €.

**Rare and interesting species of heterobasidiomycetes from Russia.** Fungi non delineati 53. By V.F. Malysheva, 2010. Edizioni Candusso, Via Ottone Primo 90, 17021 Alassio SV, Italy. <maxcandusso@libero.it>. Pp. 90, plates 52, figs 43. Price: 12.00 €.

**The Lichen Genus *Rinodina* (*Lecanoromycetidae, Physciaceae*) in North America, North of Mexico.** By J. Sheard, 2010. NRC Research Press, 1200 Montreal Rd, Bldg M-55, Ottawa, ON K1A 0R6, Canada. <pubs@nrcresearchpress.com>. Pp. 246. ISBN-139780660199412. Price: US$89.95.